APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,670	01/11/2002	Chen-Yi Lee	60629-300301	9730

		EXAMINER
7590	07/15/2004	CHASE, SHELLY A

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ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 January 2002</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-37</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>32-37</u> is/are allowed.

6)☒ Claim(s) <u>1,2,4,7,11-14,16,19 and 23-27</u> is/are rejected.

7)☒ Claim(s) <u>3, 5-6, 8-10, 15, 17-18, 20-22, & 28 to 31</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☒ None of:

　　　1.☒ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____.
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)	5) ☐ Notice of Informal Patent Application (PTO-152)
Paper No(s)/Mail Date _____.	6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1 to 37 are presented for examination.

Priority

2.   Acknowledgment is made of applicant's claim for foreign priority based on an

application filed in Taiwan on 11-28-2001. It is noted, however, that applicant has not

filed a certified copy of the 090129778 application as required by 35 U.S.C. 119(b).

Specification

3.   Applicant is reminded of the proper language and format for an abstract of the
disclosure.

        The abstract should be in narrative form and generally limited to a single
paragraph on a separate sheet within the range of 50 to 150 words. It is important that
the abstract not exceed 150 words in length since the space provided for the abstract
on the computer tape used by the printer is limited. The form and legal phraseology
often used in patent claims, such as "means" and "said," should be avoided. The
abstract should describe the disclosure sufficiently to assist readers in deciding whether
there is a need for consulting the full patent text for details.

        The language should be clear and concise and should not repeat information
given in the title. It should avoid using phrases which can be implied, such as, "The
disclosure concerns," "The disclosure defined by this invention," "The disclosure
describes," etc.

4.   The specification has not been checked to the extent necessary to determine the

presence of all possible minor errors. Applicant's cooperation is requested in correcting

any errors of which applicant may become aware in the specification.

Claim Objections

5.   Claims 13, 23, and 26 to 37 objected to because of the following informalities:

claim 13 please change "::" to -- : --, claims 26 to 37 please change "mothed" to ---

method --- .

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

7.   Claims 6, 11, 18, 23, 25 and 26 are rejected under 35 U.S.C. 112, second

paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention.   The claims are indefinite for

the following reasons:

 i) claims 6 and 18 recites the limitation "(FFI) to finish," this limitation is vague

and unclear.

 ii) claim 11 recites the limitation "wherein said apparatus can use to calculate the

Forney syndrome polynomial," the limitation is unclear and there is insufficient

antecedent basis. Claim 23 has a similar problem.

 iii) claim 25 recites the limitation "combined the calculate," there is insufficient

antecedent basis for this limitation.

 iv) claim 26, recites the limitation "said finite0field multipliers" recited on line 2.

There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims **1** to **2, 4, 7, 11** to **14, 16, 19, 23** to **25** and **26** to **27** are rejected under 35

U.S.C. 103(a) as being unpatentable over Chen et al. (*A new VLSI architecture of Reed*

Solomon decoder with erasure function, IEEE) in view of Burton (*Inversionless*

Decoding of Binary BCH codes, IEEE).

Claims **1, 13** and **25**:

Chen substantially teaches the claimed invention. Chen teaches a Reed-

Solomon decoder comprising a syndrome unit, computing a syndrome from the

received input and outputting the computed result to a key unit (see pg. 1456 sect. A),

the key unit receiving the syndrome polynomial, computing the error evaluator

polynomial and the error locator polynomial (see pg. 1456 sect. B) and a Chien search

unit receiving the polynomial form the key unit and performing the computation to output

the error value (see pg. 1456 sect. C). Chen does not specifically teach an

inversionless decomposed architecture for decoding error correction codes; however,

Burton in an analogous art teaches a modified iterative algorithm for decoding that

eliminates inversion (see pg. 464-466).   Therefore, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to modify the Reed

Solomon decoder of Chen to include the modified algorithm for eliminating inversion as

taught by Burton since, Burton teaches the elimination of inversion increases the processing time and reduces complexity. This modification would have been obvious because a person of ordinary skill in the art would have been motivated to employ a method of reducing complexity for Reed Solomon decoding.

As to the further limitation of the claim, Chen teaches that the decoder includes reduced hardware complexity when a three-stage pipeline decoder is utilized (see pg. 1455 sect. II). Chen also teaches the Key unit solves for the error locator polynomial and the evaluator polynomial (see pg. 1456, sect. B).

As per claims **2** and **14**, Chen teaches that the decoder decodes Reed Solomon codes and Bose Chandnuri Hocquenghem (BCH) codes (see pg. 1455 intro.).

As per claims **4** and **16**, Chen teaches that the decoder is applied to both error and erasures (see pg. 1455 sect. II).

As per claims **7** and **19**, Chen teaches that the decoder operates according to N cycles (see pg. 1457 sect. IV).

As per claims **11** and **23**, Chen teaches the decoder computes the Forney syndrome (see pg. 1456, sect. B).

As per claims **12** and **24**, Chen teaches a channel decoder for a transmission system (see pg. 1455 intro.).

As per claim **26**, Chen teaches the decoder includes finite-field multipliers (see pg. 1457 sect. V).

As per claim **27**, Chen teaches that the decoder reduces hardware complexity (see pg. 1458 sect. VIII).

Allowable Subject Matter

10.   Claim3, 5 to 6, 8 to 10, 15, 17 to 18, 20 to 22, and 28 to 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11.   Claims 32 to 37 are allowed.

12.   The following is a statement of reasons for the indication of allowable subject matter: the prior art made of record teaches a method for decoding RS and BCH codes using a syndrome unit, a key unit and a Chien search unit as detailed above; however, the prior art made of record, taken alone or in combination fails to teach or fairly suggest a method for solving key equation polynomials in decoding error correction codes. In particular, a novel method for inversionless decomposed architecture, which is frequency, used in BCH and Reed-Solomon decoding including: each iteration could eliminate at least one degree and a number of finite field multipliers are reduced to 3. Claims 33 to 37 are directly dependent on claim 32 and are allowed over the prior art made of record.
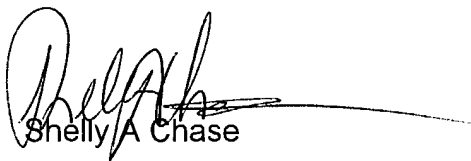
Conclusion

13.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelly A Chase whose telephone number is 703-308-7246. The examiner can normally be reached on Mon-Thur from 8:00 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 703-305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shelly A Chase